Shigellosis *(Shigella spp.)*

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Shigellosis is caused by any bacteria in the genus *Shigella*. There are four *Shigella* species or serogroups: *S. dysenteriae* (Group A), *S. flexneri* (Group B), *S. boydii* (Group C), and *S. sonnei* (Group D).

B. Clinical Description and Laboratory Diagnosis

The most common symptoms of shigellosis are diarrhea (sometimes bloody), fever, nausea, vomiting and stomach cramps. Dehydration may be severe, especially among infants and the elderly. Asymptomatic infections can also occur. The disease is usually self-limiting, lasting 4–7 days. The severity of the illness and the case-fatality rate are usually a function of the host and species, with the very young and the elderly experiencing the most severe illness. Antibacterials shorten the duration and severity of the illness and the duration of pathogen excretion; they should be used in individual cases if warranted by the severity of the illness or to protect contacts (i.e., in daycare centers or institutions) when epidemiologically indicated. *S. dysenteriae* is usually associated with more severe disease and complications including toxic megacolon and hemolytic-uremic syndrome. Laboratory diagnosis is based on isolation of *Shigella* from feces or rectal swabs.

C. Reservoirs

Humans are the only significant reservoir.

D. Modes of Transmission

Shigella is transmitted via the fecal-oral route. The most common mode of transmission is person-to-person spread of the bacteria from a case or carrier. A very small dose of *Shigella* is needed to cause illness (probably 10–100 organisms). Individuals shedding the bacteria may also contaminate food by failing to properly wash their hands before foodhandling activities, potentially causing large numbers of people to become ill. Person-to-person spread typically occurs among household contacts, preschool children in daycare, and the elderly and developmentally disabled living in residential facilities. Transmission can also occur person-to-person through certain types of sexual contact (*e.g.*, oral-anal contact). Flies can potentially spread the bacteria by landing on contaminated feces and then on food.

E. Incubation Period

The incubation period can vary from 12 to 96 hours, but is usually about 1–3 days. It can be up to a week for *S. dysenteriae.*

F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person excretes *Shigella* in their stool. This usually lasts for about 4 weeks from onset of illness. Asymptomatic carriers may transmit infection; rarely, the carrier state may persist for months or longer. Effective antibiotic treatment has been shown to decrease the shedding period to a few days.

G. Epidemiology

Shigellosis has a worldwide distribution, with approximately 600,000 deaths reported annually throughout the world. Most of these deaths occur in children under 10 years of age. Secondary attack rates can be as high as 40% in households. Outbreaks occur in daycare centers, among men who have sex with men, and in jails. Outbreaks have also been caused by contaminated imported food. In New Jersey, approximately 450 cases are

reported annually to the New Jersey Department of Health and Senior Services (NJDHSS). *S. sonnei* is the most common *Shigella* species reported in New Jersey.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

CASE CLASSIFICATION

A. CONFIRMED
Isolation of *Shigella* species from any human body site, regardless of symptoms.

B. PROBABLE
A clinically compatible case that is epidemiologically linked to a confirmed case.

C. POSSIBLE
Not used.

NOTE: Isolates of *Shigella* spp. must be submitted within 3 working days to the New Jersey Department of Health and Senior Services, Division of Public Health and Environmental Laboratories, P. O. Box 361, John Fitch Plaza, Trenton, NJ 08625-0361.

B. Laboratory Testing Services Available

The Public Health and Environmental Laboratories (PHEL) will test stool specimens for the presence of *Shigella* and will also confirm and serotype isolates of *Shigella* obtained from clinical specimens at other laboratories. The PHEL requests that all laboratories submit *all* isolates cultured for typing to aid in public health surveillance (N.J.A.C. 8:57-1.6 (f)). For more information contact the PHEL at 609.292.7368.

After authorization from the Division of Epidemiology, Occupational and Environmental Health, PHEL will test implicated food items from a cluster or outbreak.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify whether the case may be a source of infection for other persons (*e.g.*, a diapered child, daycare attendee or foodhandler) and, if so, to prevent further transmission.
- To identify transmission sources of public health concern (*e.g.*, a restaurant or a commercially distributed food product) and to stop transmission from such sources.

B. Laboratory and Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (N.J.A.C.) 8:57-1.8 stipulates that health care providers and laboratories report (by telephone, confidential fax, over the Internet using Communicable Disease Reporting System [CDRS] or in writing) all cases of shigellosis to the local health officer having jurisdiction over the locality in which the patient lives, or, if unknown, to the health officer in whose jurisdiction the health care provider requesting the laboratory examination is located.

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C. Health Officers Reporting and Follow-Up Responsibilities

Reporting Requirements

N.J.A.C. 8:57-1.8 stipulates that each local health officer must report the occurrence of any case of shigellosis, as defined by the reporting criteria in Section 2A above using the CDS-1 form. A report can be filed electronically over the Internet using the confidential and secure CDRS.

2. **Case Investigation**

   a. It is the health officer's responsibility to investigate the case by interviewing the patient and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the patient's healthcare provider or the medical record.

   b. Use the following guidelines to complete the form:
      1) Accurately record the demographic information, date of symptom onset, symptoms, and medical information.
      2) When asking about exposure history (e.g., food, travel, activities), use the incubation period for shigellosis (12–96 hours). Specifically, focus on the period beginning a minimum of 12 hours prior to the case's onset back to no more than 96 hours before onset. If possible, record any restaurants at which the case-patient ate, including food item(s) and date consumed.
      3) Ask questions about travel history and outdoor activities to help identify where the case-patient became infected.
      4) Ask questions about water supply (shigellosis may be acquired through water consumption).
      5) Ask questions about household/close contacts, pet or other animal contact.
      6) Ask questions about travel history and outdoor activities to help identify where the case-patient became infected.
      7) Determine whether the case-patient attends or works at a daycare facility and/or is a foodhandler.
      8) If there have been several unsuccessful attempts to obtain patient information (*e.g.*, the patient or healthcare provider does not return calls or does not respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely. **If CDRS is used to report the case, the information can be recorded in the "Comments" sectio**n.

   b. After completing the form, it should be mailed in an envelope marked "Confidential" to the NJDHSS IZDP, or the report can be filed electronically over the Internet using the confidential and secure CDRS. The mailing address is:

      NJDHSS
      Division of Epidemiology, Environmental and Occupational Health
      Infectious and Zoonotic Diseases Program
      P.O.Box 369
      Trenton, NJ 08625-0369

   c. Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand, and, if necessary, institute, the control guidelines listed below in Section 4, "Controlling Further Spread."

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (N.J.A.C. 8:57-1.12)

Foodhandlers with shigellosis are excluded from handling food handling until they no longer have symptoms and they have at least **two (2)** successive negative stool tests (collected 24 or more hours apart, but not sooner than 48 hours following completion of antimicrobial therapy). *Note:* A case of shigellosis is defined by the reporting criteria in Section 2A. of this chapter.

Quarantine of Contacts

Contacts with diarrhea who are foodhandlers shall be isolated and quarantined in the same manner as a case (see above paragraph) and handled in the same fashion.

Note: A foodhandler is any person directly preparing or handling food. This can include a patient care or a childcare provider.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Daycare

Since shigellosis may be transmitted person-to-person through fecal-oral transmission, it is important to carefully follow up cases in a daycare setting. General recommendations include:

- When *Shigella* infection is identified in a child care attendee or staff person, stool specimens from other symptomatic attendees, staff, and household members must be cultured. Symptomatic persons with positive stool cultures for *Shigella* may receive antibiotic therapy. The decision to use antibiotics is based upon the severity of the case and potential to spread infection.
- Children and staff members with shigellosis should be excluded until their diarrhea has resolved and **two (2)** successive stool cultures are negative for *Shigella spp.* collected 24 hrs or more apart but not sooner that 48 hours after completion of antibiotic therapy.
- Infection control procedures including proper hand-washing, sanitary disposal of diapers and feces, proper food handling and environmental sanitation should be implemented.
- If more than one person is infected, cohorting should be considered until stool tests are negative.

School

Since shigellosis may be transmitted person-to-person through fecal-oral transmission, it is important to carefully follow up cases in a school setting. General recommendations include:

- Students or staff with *Shigella* infection who have diarrhea should be excluded until their diarrhea has resolved.
- Students or staff with *Shigella* who do not handle food, have no diarrhea or mild diarrhea, and are not otherwise sick may remain in school if special precautions are taken.
- Students or staff who handle food and have *Shigella* infection (symptomatic or not) must not prepare food until their diarrhea has resolved and they have **two (2)** negative stool tests collected 24 hours or more apart but not sooner that 48 hours after completion of antibiotic therapy, if antibiotics are given.

Community Residential Programs

Actions taken in response to a case of shigellosis in a community residential program will depend on the type of program and the level of functioning of the residents. In addition to reporting the outbreak to the Local Health Department, facility management should also report any such outbreak to the NJDHSS Division of Long-Term Care (LTC) Compliance and Surveillance Program, NJDHSS by phone at 1.800.792.9770 or fax at 609.633.9060. Written report should be mailed in 72 hrs to NJDHSS, LTC Compliance and Surveillance Program, P.O. Box 367, Trenton, NJ 08625. The NJDHSS considers an event to be an “outbreak” if the

infectious disease affects 10% of the population, either on one floor, a unit or total capacity of the facility, or three (3) cases of similar symptoms within the 48 – hour period.

In long-term care facilities, residents with shigellosis should be placed on standard (including enteric) precautions until their symptoms subside and they have **two (2)** consecutive negative tests for *Shigella.* Staff members who give direct patient care (*e.g.*, feed patients, give mouth or denture care, or give medications) are considered foodhandlers and are subject to foodhandler restrictions, (see Section 4 A above). In addition, staff members with *Shigella* infection who are not foodhandlers should not work until their diarrhea has resolved.

In residential facilities for the developmentally disabled, staff and clients with shigellosis must refrain from handling or preparing food for other residents until their diarrhea has resolved and they have **two (2)** negative stool tests collected 24 hrs or more apart but not sooner that 48 hours after completion of antibiotic therapy, if antibiotics are given. In addition, staff members with *Shigella* infection who are not foodhandlers should not work until their diarrhea has resolved.

Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases of shigellosis in a city/town is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. A common vehicle (such as water, food or association with a daycare center) should be sought and applicable preventive or control measures should be instituted. If food is considered a suspect source of infection, use the Patient Food History Listing and Patient Symptoms Line Listing to facilitate recording additional information. Control of person-to-person transmission requires special emphasis on personal cleanliness and sanitary disposal of feces. Consult with the NJDHSS Infectious and Zoonotic Diseases Program. The IZDP staff can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several jurisdictions and therefore be difficult to identify at a local level.

D. Preventive Measures

Environmental Measures

Implicated food items must be removed from the environment. A decision about testing implicated food items can be made in consultation with the Infectious and Zoonotic Diseases Program and the NJDHSS Food and Drug Safety Program (FDSP). FDSP can help coordinate pickup and testing of food samples. If a commercial product is suspected, FDSP will coordinate follow-up with relevant outside agencies (e.g. FDA, USDA). FDSP may be reached at 609.588.3123.

Note: The role of the FDSP is to provide policy and technical assistance with the environmental investigation such as interpreting the New Jersey Food Code, conducting a hazardous analysis and critical control point (HACCP) risk assessment, initiating enforcement actions and collecting food samples.

The general policy of the PHEL is only to test food samples implicated in suspected outbreaks, not in single cases (except when botulism is suspected). The health officer may suggest that the holders of food implicated in single case incidents locate a private laboratory that will test food or store the food in their freezer for a period of time in case additional reports are received. However, a single, confirmed case with leftover food consumed within the incubation period may be considered for testing under special circumstances.

Personal Preventive Measures/Education

To avoid future exposures, recommend that individuals:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- After changing diapers, wash the child's hands as well as their own.

- In a daycare setting, dispose of feces in a sanitary manner.
- When caring for someone with diarrhea, scrub their hands with plenty of soap and water after cleaning the bathroom, helping the person use the toilet, or changing diapers, soiled clothes or soiled sheets.
- Avoid sexual practices that may permit fecal-oral transmission. Latex barrier protection should be emphasized as a way to prevent the spread of shigellosis to sexual partners as well to prevent the exposure to and transmission of other pathogens.
- Keep flies from contaminating food.
- Anyone with diarrhea should not use a pool or swim in a pond.

International Travel
The following recommendations can be helpful to travelers in developing countries:

- "Boil it, cook it, peel it, or forget it."
- Drink only bottled or boiled water, keeping in mind that bottled carbonated water is safer than non-carbonated water.
- Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.
- Eat foods that have been thoroughly cooked and are still hot and steaming.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well.
- Peel your own raw fruits or vegetables and do not eat the peelings.
- Avoid foods and beverages from street vendors.

Note: For more information regarding international travel contact the Centers for Disease Control and Prevention (CDC), Traveler's Health Office at (877) 394-8747 or through the Internet at <http://www.cdc.gov/travel>.

ADDITIONAL INFORMATION

A *Shigellosis Fact Sheet* can be obtained at the NJDHSS website <http://www.state.nj.us/health>. Click on the "Topics A to Z" link and scroll down to the subject "*Shigellosis*."

The formal Centers for Disease Control and Prevention (CDC) surveillance case definition for shigellosis is the same as the criteria outlined in Section 2 A of this chapter. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. For reporting to the NJDHSS, always refer to Section 2 A.

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